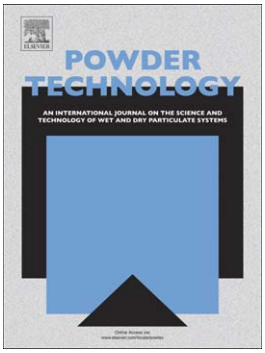

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Ammonium aluminium carbonate hydroxide $NH_4Al(OH)_2CO_3$ as an alternative route for alumina preparation: comparison with the classical boehmite precursor

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Abstract

Ammonium aluminium carbonate hydroxide (AACH) is a promising alternative precursor for preparation of alumina with high purity and original textural properties. In this paper, both boehmite (classical alumina precursor) and AACH were precipitated in a stirred tank reactor with close process parameters. Preparation protocols were thus compared. Main differences between both protocols were pointed out (reactant molar ratio influence, alumina concentration, filtration / washing step). This study helps for the choice of the appropriate preparation route for alumina precursor synthesis. As-synthesized boehmite and AACH precursors were then calcined between 500 °C and 1000 °C. The textural properties of the corresponding aluminas were characterized. At 500 °C, AACH-derived alumina revealed to be particularly porous, with larger mean pore diameter (*ca.* 29 nm) than boehmite-derived alumina (*ca.*6 nm). Moreover, AACH-derived alumina exhibited a high surface area. However, a more accurate analysis revealed that this high specific surface area (407 $m^2.g^{-1}$) is mostly due to microporosity formation during the calcination step. At higher calcination temperature, boehmite and AACH-derived aluminas exhibited different behaviors against sintering. In particular, the latter showed an interesting ability to maintain a constant mean pore diameter, regardless of the calcination temperature.

Keywords: Precipitation, alumina, AACH, boehmite, sintering